

# A New Hypothesis for Biophotonic Communication in Meditation

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## ABSTRACT:

This research work is an attempt to present a new hypothesis for biophotonic communications in Meditation. India has been the land of civilizations and spirituality, contributing a lot in dimensions of mystic phenomena eluding understanding. From time immemorial such experiences and practices have been handed down to generations by word of mouth. This research work is the outcome of inspiration dawned on the authors to scientifically investigate such phenomena. This is one of their first systematic studies in this direction. This work concentrates on presenting a hypothetical explanation to the mystic phenomena related to biophotonic communication renowned to be caused during Meditation.

**Keywords:** Meditation, Consciousness Communications, Meditation.

## INTRODUCTION

This research work is an attempt to explain and present a new scientific perception of the consciousness communications that are renowned to be caused during Meditation. Meditation is a mental activity associated with attaining a deeply restful yet fully alert state [1] and is characterized by the attainment of a restful yet fully alert physical and mental state practiced by many as a self-regulatory approach to emotion management [2].

Physiological alterations in the human subjects led to the attention of many researchers and journals to concentrate on Meditation, and its effect on the human subject was assessed in various ways. Meditation is labeled as “A wakeful Hypometabolic Physiologic State” [3].

A series of research articles have been published on Meditation [4 - 8]. The idea of a body-mind connection is not a new one. In fact, it is only in our recent past that the two ideas have been seen as separate [9]. This paper proposes Biophotonic Communication in Meditative Consciousness Communications between the meditative human source and the meditative human subjects.

## MEDITATION, CONSCIOUSNESS AND MUSIC

Meditation is an ancient spiritual practice that has recently been studied due to its potential health promoting effects, and its status as a special form of consciousness, different from ordinary waking and sleep.

### *Meditation*

The recent decades have witnessed a marked change in the perspective of viewing Meditation as a solely mystic process of spiritual quest to a complementary effective method in several health situations [10]. In a survey of the EEG characteristics of persons practising Meditation, the theta bursts were preceded and followed by alpha rhythm. Subject reports elicited during theta bursts indicated pleasant states with intact situational orientation and no subjective experiences related to sleep. It is hypothesized that theta burst may be the manifestation of a state adjustment mechanism which comes into play during prolonged low-arousal states, and which may be related to EEG patterns of relaxation in certain behavioural conditions [11].

Changes in EEG coherence patterns were used to test a field model that proposes a common field of "pure consciousness" linking all individuals. The experimental data support a field model of consciousness [12]. While a considerable number of studies has been carried out with EEG, only few studies have used PET and fMRI [8, 13].

## Consciousness

Consciousness is a subtle phenomena very closely related to Meditation. It has been debated in many areas, including brain sciences [14]. Exploration and reflection on the interfacing of religion and the neurosciences in the last twenty-five years provide a unique point of convergence on the relationship between science and religion. By the 1990s, meaning-making and integrating consciousness emerged as shaping the agenda between religion and cognitive neuroscience. The emerging methodology combines analogical continuities among levels of complexity and metaphorical leaps of inferential patterning [15].

Also, Global brain imaging techniques (PET and fMRI) indicate that a different brain network is involved in moving the focus of attention from that involved in the initial processing of an attended input [16, 17].

Consciousness is a subtle phenomenon, which has so far resisted all attempts to understand it, in spite of the present 'race for consciousness' [18]. Recent neuroscientific works on the problem have surprisingly neglected attention as a guide to consciousness [19].

Without attention to an input there can be no awareness of it. Yet several recent papers on consciousness [20 - 23] have surprisingly neglected attention as a guide to understanding consciousness. The following paragraphs concentrate on Music as an attention input.

## Music

Meditation is defined as an exercise, which usually involves training the individual to focus the attention or consciousness in a single object, sound, concept or experience [24]. Apart from Meditation, relaxation could also be induced through chemical means (muscle relaxant drugs, such as Valium) or through biofeedback techniques

in which the subject's EMG activity is monitored and revealed to the subject *via* light or tone signals. Such biofeedback techniques allow persons to develop voluntary control over internal systems (such as heart rate, blood pressure, EEG activity) previously thought to be beyond such control [25].

The human being is thought of as a musical instrument. By changing the patterns and rhythms of sound and breath, it is possible to link all the systems of the body that regulate excitement, relaxation, action, reaction and intelligence. By tuning our inner vibrations we can literally resonate ourselves to the heavens, thus creating that state where we feel divine and in touch with our higher source of healing energy.

In basic meditation, only a small area of the brain was engaged while the addition of selected sounds in Medical Meditation produced more pronounced levels of activation. [26]. The forthcoming paragraphs discuss Phase Locked Loop and later explains alterations in Consciousness states on the basis of Phase Locked Loop.

## PHASE LOCKED LOOP

The Phase Locked Loop (PLL) is a conventional circuit used to lock to the input frequency when the frequency is within the PLL's bandwidth. The PLL is basically a feedback control system that controls the phase of the Voltage Controlled Oscillator (VCO). The input signal is applied to one input of a phase detector. The other input is taken from the output of a Divide by 1 Counter. The output of the Phase Detector will be a difference of the phases of the two inputs, and is applied to the Loop Filter. The Loop Filter determines the dynamic characteristics of the PLL and controls the VCO. The output frequency is N times the input, governed by the Divide by N counter. In a specific case of N = 1, the Divide by N counter becomes a Divide by 1 Counter, and the output frequency is exactly the same as the input frequency.

The design of the Loop Filter is decided by the proposed application of the PLL. If the PLL expects a single input frequency, then the bandwidth of the Loop Filter can be narrow. If the PLL is required to acquire and track a signal, then the bandwidth of the Loop Filter will be suitably larger

([www.cardinalxtal.com/docs/notes/cardinal\\_phase\\_lock\\_loop\\_basics.pdf](http://www.cardinalxtal.com/docs/notes/cardinal_phase_lock_loop_basics.pdf), as on Feb 28, 2007)

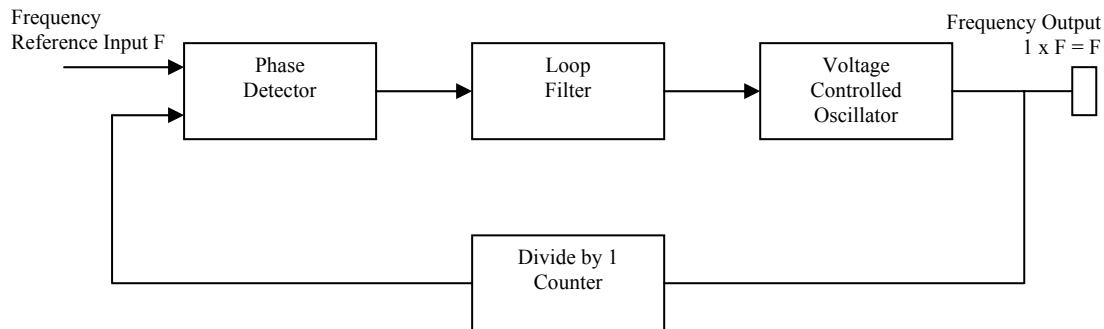


Fig 1. Block Diagram of a Phase Locked Loop (Courtesy: [www.cardinalxtal.com/docs/notes/cardinal\\_phase\\_lock\\_loop\\_basics.pdf](http://www.cardinalxtal.com/docs/notes/cardinal_phase_lock_loop_basics.pdf), as on Feb 28, 2007)

Figure 1 shows a Phase Locked Loop frequency multiplier. Since  $n = 1$ , the Voltage Controlled Oscillator gives an Output that is 1 times  $F$ , that is,  $F$  itself.

## MULTIPLE PHASE LOCKED LOOP (MPLL) MEDITATION

A summary of the salient points understood from the previous paragraphs is that

1. Music can be an attention input to Meditation.
2. Consciousness is a subtle phenomena associated with Meditation.
3. EEG pattern changes were observed in Meditation.
4. Changes in EEG coherence patterns supported a field model of consciousness.

An inference from the above summary is that Music can be an attention input to Meditation, giving rise to changes in EEG patterns, whose changes were reflected in a field model of consciousness. Translated into a simple expression, this would imply that Meditation with music input can lead to altered states of consciousness.

If Meditation with music input can lead to altered states of consciousness via alterations in EEG patterns, then a scientific perception of altered states of consciousness can be had.

Recalling the discussion in the previous section about Phase Locked Loop, we find that the foundational concept of Phase Locked Loop can be applied to explain altered states of consciousness due to Meditative Music input. Assuming that a human subject goes into meditative states aided by attention to music input and experiences changes in his EEG patterns, it is most likely that the music input which has triggered the meditative state

continues to guide the changes in EEG patterns of the human meditative subject. This phenomenon is very much similar to the foundational concept of the Phase Locked Loop where the system acquires and tracks the frequency of the input. Here, meditative music input is analogous to the PLL frequency input and the EEG state is analogous to the output frequency of the PLL. In a similar manner, the meditative process is analogous to the Phase Locked Loop.

There is one exception that needs to be tackled. The above explanation / interpretation holds good as long as there is a single output, that is, a single human subject. But, there is an exception that arises when there are multiple human subjects. It is conventionally known that each human subject has distinct and unique responses to meditation. Therefore, their Meditative PLL analogy could fail to express the phenomenon.

In such a case with multiple meditative human subjects, the authors propose a new concept called Multiple Phase Locked Loop (MPLL). MPLL can be explained as multiple PLLs having their unique bandwidths responding to the multiple input frequency and giving out different output frequencies as response to their bandwidth, acquiring and tracking characteristics. Expressed conventionally, the frequencies present in the meditative music input would be triggering and guiding various EEG patterns in various human meditative subjects at the same time. Translated equivalently in terms of alterations in states of consciousness, meditative music input can initiate and guide alterations in states of consciousness in meditating human subjects according to their

intrinsic characteristics analogous to MPLL, thus leading to a new terminology called MPLL Meditation, where MPLL stands for Multiple Phase Locked Loop.

Hence, it can be understood that multiple human subjects with unique intrinsic meditative characteristics can respond to multiple meditative input, acquiring and tracking bandwidth within their inherent capacities resembling a MPLL (Multiple Phase Locked Loop). The MPLL Meditative process is thus understood. The forthcoming paragraphs discuss possible communication phenomena between the multiple meditative input and the multiple human subjects, leading and guiding them into the depths of Meditative experiences.

## BIOPHOTONIC CONSCIOUSNESS COMMUNICATION

The research on bio-informational aspects of biophotons in the IR to UV range can be traced back to Alexander G. Gurwitsch more than seventy years ago. Despite serious experimental difficulties it is now clear to every scientist working in this field that photon emission could be detected from nearly all living cells. Bio-photons are characterized by their quantum character and are supposed to escape from a coherent field [27].

### *Biophotons*

Biophotons have frequencies in the range 200-800 nm. They are coherent weak radiation, almost 20 orders of magnitude weaker than common fluorescence of photophosphorence. Biophoton emission is a signature of living matter ([www.helsinki.fi/~matpitka/articles/biophotons.pdf](http://www.helsinki.fi/~matpitka/articles/biophotons.pdf)) as on March 1, 2007)

According to the biophoton theory developed on the base of these discoveries the biophoton light is stored in the cells of the organism - more precisely, in the DNA molecules of their nuclei - and a dynamic web of light constantly released and absorbed by the DNA may connect cell organelles, cells, tissues, and organs within the body and serve as the organism's main communication network and as the principal regulating instance for all life processes. The processes of morphogenesis, growth, differentiation and regeneration are also explained by the structuring and regulating activity of the coherent biophoton field. The holographic biophoton field of the brain and the nervous

system, and maybe even that of the whole organism, may also be basis of memory and other phenomena of consciousness, as postulated by neurophysiologist Karl Pribram and others. The consciousness-like coherence properties of the biophoton field are closely related to its base in the properties of the physical vacuum and indicate its possible role as an interface to the non-physical realms of mind, psyche and consciousness (<http://www.transpersonal.de/mbischof/englisch/webbookeng.htm> as on March 1, 2007)

Biophoton emission is a general phenomenon of living systems. It concerns low luminescence from a few up to some hundred photons-per-second per square-centimeter surface area. At least within the spectral region from 200 to 800nm. The experimental results indicate that biophotons originate from a coherent (or/and squeezed) photon field within the living organism, its function being intra- and inter-cellular regulation and communication [28].

### *Biophoton Communication*

Biological Systems are governed by the special interaction of a coherent electromagnetic field (biophotons) and biological matter. There is a permanent feedback coupling between field and matter in a way that the field directs the location and activity of matter, while matter provides the boundary conditions of the field. Since the field is almost fully coherent, the interference patterns of the field contain the necessary information about the regulatory function. The interference structures are not stable, but vary in concordance with the rather complex spatio-temporal interactions between field and matter ([http://www.lifescientists.de/ib0203e\\_1.htm](http://www.lifescientists.de/ib0203e_1.htm) as on March 2, 2007).

### *Proposed Biophoton Communication among Meditative Consciousness Fields*

An understanding of the earlier paragraphs on Meditative Consciousness fields suggests that the human source of the meditative music input and the human meditative subject would be generating a meditative consciousness field. Inferring in conjunction with the discussion on Biophoton Communication given above, the authors suggest a model of *Biophotonic Consciousness Communication* where the Meditative Consciousness Field of the human source would interact with the Meditative Consciousness Field of

the human subject through biophotonic communication, where the alterations in consciousness states of the human subject caused due to Meditative Music Input would actually be guided by the alterations in consciousness states of the human source of meditative music input through biophotonic communication. Rephrased in a simple way, the human source would guide the human subject in alterations of consciousness states through biophotonic communication *via* meditative phase locked loop (MPLL) – the proposed Biophoton Communication among Meditative Consciousness Fields.

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